# The Closer the Better? Examining Support for a Large Urban Redevelopment Project in Atlanta

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## Abstract

The Atlanta BeltLine (BeltLine) is a large urban redevelopment project that is transforming 22 miles of historical railroad corridors into parks, trails, pedestrian-friendly transit, and affordable housing in the center of Atlanta, Georgia. This study examines how proximity to the BeltLine and other factors relate to public support for it, with data from a general public survey conducted in the summer of 2009. The result shows that support significantly declines as distance to the BeltLine increases. However, after controlling for expected use of the BeltLine parks and transit, the role of distance fades. Further, the results show that being a parent within the city limits is associated with the support for the BeltLine, which implies that the concern over Tax Increment Financing (TIF) affecting future school quality hampers the support of the project. The findings point to individual tastes and family circumstances as driving support for the redevelopment project, rather than strictly property-specific attributes (as the homevoter hypothesis would predict).

Another contribution of this study is to address the technical problem of missing precise spatial location values. Several imputation techniques are used to demonstrate the risks and remedies to missing spatial data.

## 1. Introduction

This article uses the Atlanta BeltLine (BeltLine) as a case study to examine the relationship of distance and other factors to public support for urban redevelopment projects. The BeltLine is a large, multibillion-dollar urban redevelopment project centered in Atlanta, Georgia. The core purpose of the project is to transform 22 miles of historic railroad corridors into pedestrian-friendly rail transit, multi-use trails, parks, and affordable housing. The BeltLine is currently one of the largest urban redevelopment and mobility projects in the United States and its proponents have noted that it is able to “transform the city” of Atlanta (Atlanta Development Authority, 2005; Kirkman, Noonan, & Dunn, 2012). Thus, interest in and impacts of the BeltLine project are expected to extend broadly through the Atlanta urban area. The Atlanta BeltLine project presents another example of major urban redevelopment projects that seek to transform urban form, such as the High Line in New York City (Loughran, 2014), Cheonggyecheon restoration in Seoul (Lee & Anderson, 2013), and urban regeneration in Barcelona (Degen & GarcÍA, 2012).

The association between distance to the BeltLine and public support for it could result from a variety of factors. First, being closer to amenities such as new parks, trails, and public transit is expected to be positively related to residents’ support, especially for those who regularly use these amenities. Second, even those who do not directly enjoy these amenities may still benefit from the increase of property values because of the increase in amenities, as posited by the homevoter hypothesis. First developed by Fischel (2005), the homevoter hypothesis holds that homeowners politically support actions of local governments that increase their property values. In this case, local homeowners are expected to support the BeltLine as long as the project increases their property values. The property value increase could be due to the increase of actual or anticipated accessibility to amenities or due to the perception of “Atlanta being a better place.” Since being closer to the BeltLine is expected to yield a higher property value premium, which makes homeowners more supportive, the distance is theoretically negatively related to support. This study tests the homevoter hypothesis by determining how public support varies with distance, under the assumption that property value increases because of the BeltLine are correlated with the distance to it.

On the other hand, support for the BeltLine could be hampered by projects aiming to increase housing supply and affordable housing in particular. According to Atlanta BeltLine, Inc. (ABI), the BeltLine project aims to create 28,000 new housing units, 5,600 of which as affordable housing, over twenty-five years (Atlanta BeltLine Inc., 2013). Under the homevoter hypothesis, homeowners near the BeltLine's affordable housing may oppose the project because a greater housing supply would be harmful to their property values. However, while some previous studies confirm the negative effect of affordable housing projects (Santiago, Galster, & Tatian, 2001), the direction of the external neighborhood effect is still under debate (Deng, 2011).

Further, a common redevelopment tool, Tax Increment Financing (TIF), may be another important factor affecting support and the role of distance. TIF allows local governments to fund particular projects with the future growth in property taxes – the increment – created by the project itself. Mainly funded by TIF, the BeltLine will essentially pay for itself by the property tax increment collected in the Tax Allocation District (TAD) over the next 25 years. By reserving that increment for servicing the debt incurred to implement the BeltLine, however, the TIF blocks the use of future tax revenue growth for other categories, especially public education, for a period of 25 years (Brueckner, 2001). In the U.S., local governments provide nearly half of public school system revenue, and 66 percent of local revenue derives from property taxes (McGuire, Papke, & Reschovsky, 2015). The reallocation of future property tax revenue is expected to lower the quality of public school in the future if educational costs keep growing. With the BeltLine-induced population growth, it is thus expected that residents with children, especially those who plan to send their kids to public schools, may favor the BeltLine less. Since the Atlanta

Public Schools district (APS) can redistribute budget shocks around its system, all public schools in APS can be affected. Thus, households with children in the APS jurisdiction may support the BeltLine less.

Another focus of this study is the problem of missing precise spatial location information, a common challenge in empirical work. Data used in this study are from a survey conducted in the summer of 2009 that asked about opinions and expectations about the BeltLine. One limitation of using these survey data for this study is that only half of the respondents provide their actual addresses (the rest gave only zip codes). This information may not be missing at random. To solve this missing-spatial-location problem, this study attempts several imputation approaches, including utilizing zip-code centroids, population-weighted zip-code centroids, and two multiple-imputation methods. Although the main findings here are not particularly sensitive to the selection of particular imputation methods, the analysis demonstrates several alternative approaches with advantages over merely dropping observations with missing data.

The results of this study indicate that support for the BeltLine among residents significantly decays along with distance to the project. Yet this study also points to individual desire for accessibility as the main factor behind the distance relationship, which is not expected under the homevoter hypothesis. Also, the results show that residents with kids in affected school zones express less support for the BeltLine. Taken together, this suggests that public support for large redevelopment projects may depend on more than just how the project impacts housing values. Individual tastes and household circumstances play a role as well, which raises more questions about gentrification and spatial sorting as key to driving public support for urban regeneration.

## 2. Background

### 2.1 The Atlanta BeltLine

The BeltLine is an urban redevelopment project to transform 22 miles of historic railroad corridors into 22 miles of pedestrian-friendly rail transit and create 33 miles of multi-use trails, 1,300 acres of parks, and 5,600 units of affordable housing to connect 45 neighborhoods around the center of Atlanta, Georgia. Stemming from a 1999 master's thesis by Georgia Tech student Ryan Gravel, the BeltLine project gained support from Atlanta in 2005, and became an ongoing project after the creation of Atlanta BeltLine, Inc. in 2006. The BeltLine TAD serves as the primary funding source of the BeltLine. 6,500 acres of TAD is projected to generate $1.7 billion in tax revenue in a twenty-five year window, which is about sixty percent of the original estimated cost. The remainder of the cost is expected to be covered by local contributions and federal funds (Atlanta BeltLine Inc., 2013). Figure 1 illustrates the location of the 22-mile railroad corridors and 6,500 acres of Atlanta BeltLine TAD.

**[Insert Figure 1 here]**

The Atlanta BeltLine project is expected to boost property values in its host neighborhoods and perhaps in an even larger range. Immergluck (2009) conducted a hedonic housing price analysis for single-family house sales in Atlanta from 2000 to 2006, and found that after 2005, sales closer to the BeltLine TAD enjoyed a premium in sales price. Immergluck (2009) claims that this proximity premium is a result of both gentrification and local newspaper coverage as speculation bids up prices for an as-yet-unbuilt BeltLine. In 2005 alone, more than 100 stories about the BeltLine appeared in *Atlanta Journal-Constitution*, a major daily paper in Atlanta (Immergluck, 2009). The real estate market in the city may have been broadly impacted in response to the media coverage, though the effect should decay as distance increases.

### 2.2 Support for Urban Redevelopment Projects

The relationship between support for urban redevelopment projects and property value increments can be described by the homevoter hypothesis. The homevoter hypothesis holds that homeowners politically support actions of local governments that increase property values (Fischel, 2005). The homevoter hypothesis has received some empirical support (e.g., Been, Madar, & McDonnell, 2014; McGregor & Spicer, 2014; McLaughlin, 2012). Brunner et al. (2001, 2003) analyze the voting results for a school voucher referendum in California and conclude that homeowners in neighborhoods with superior public schools are less likely to vote for the voucher, because of concerns that property values would decrease. Dehring et al. (2008) also support the homevoter hypothesis in their analysis of the results of a 2004 referendum in Arlington, Texas, concerning a publicly subsidized stadium to host the National Football League's Dallas Cowboys. The Atlanta BeltLine case provides an additional chance to indirectly test the homevoter hypothesis. Under the assumption that the level of property value increase caused by Atlanta BeltLine is correlated with distance, as shown by Immergluck (2009), the homevoter hypothesis can be indirectly tested by showing that the distance to BeltLine is correlated with the support.

Other factors that correlate with distance might also help explain public support. A household's particular demand for the project's amenities likely correlates with its proximity. Unlike home location, these factors are not capitalized into housing values and thus would not factor into a homevoter's support of the project. Yet if factors other than expected property value impacts influence public support for a project, then households' expected use values may also predict project support.

### 2.3 Tax Increment Financing

The introduction of TIF is another important factor that can affect support for urban redevelopments. A widely used local government tool for financing economic development in the United States, the main advantage of TIF is providing new funds currently without raising tax rates or providing new revenue-raising authority (Briffault, 2010; Man & Rosentraub, 1998). One concern about TIF related to examining the homevoter hypothesis is the impact of tax-reallocation on education expenditures. Weber (2003) analyzes TIF's impact on the finances of school districts in Cook County, Illinois, and reveals that municipal use of TIF depletes the property tax revenues of schools during the lifespan of the TIF. Part of this is by design, where TIF districts span multiple taxing jurisdictions (Brueckner, 2001). Since the property tax provides a large share of the public school revenue (McGuire et al., 2015), and the quality of public schools is a critical determinant of property values (Brasington, 1999; Haurin & Brasington, 1996), the quality of public schools and property values interact with each other. If the homevoter hypothesis holds, homeowners within the TAD, or those who live outside the TAD but expect the project to lower their school quality and decrease their property values, are likely to favor the BeltLine less. Crucially, this school quality effect is capitalized based on the jurisdiction of the property and not whether the property's resident currently has kids.

These concerns over TIF and school quality around BeltLine project are not just theoretical. A year after the TAD was created in 2005, the BeltLine's TIF was legally challenged on the grounds that it unconstitutionally reallocated funds away from the APS. In 2008, the Georgia Supreme Court agreed and ruled the TAD unconstitutional. Later that year, voters approved a statewide referendum to ratify a constitutional amendment that allows using school taxes to fund TADs. By the summer of 2009, this victory for BeltLine proponents resolved considerable legal uncertainty around the project and also raised awareness in the general public of the TIF-related interdependence between the BeltLine and APS. (Uncertainty over the outcome, especially for transit components, remained.) Thus the summer of 2009 marked a key juncture in the BeltLine's timeline where the project was approved and implementation had just begun, but its completion was still many years away. The 2009 general public survey usefully captures a sort of "baseline" condition uncontaminated by a post-2009 implementation that features notable successes, more legal controversies and disputes over diminished school funding, and growing concerns over gentrification and inequitable roll-out of the BeltLine.

## Data

Data used in this study are mainly collected from an online survey conducted in the summer of 2009 about the Atlanta BeltLine. At that time, the project construction had begun but very little of it was open. 37 questions were asked of participants' backgrounds, their opinions about the Atlanta region as it was in 2009 and as it might become, and their attitudes and expectations about the BeltLine project. To mitigate a social desirability bias (Krumpal, 2013) and BeltLine-related response bias, the invitation letter indicated that it was an opinion survey for Atlanta area residents on the topic of "housing, green space, and transportation." A random sample was drawn from Survey Sampling International's (SSI) online panel, selecting adults in the Atlanta metropolitan area, with 60 percent of respondents from within the city of Atlanta. A response rate of five percent is reported, which is favorable compared to other web-based surveys at the time (Kaplowitz, Hadlock, & Levine, 2004; Nulty, 2008). SSI's online panel of 1.5 million panelists has the same age profile as non-panelists but appears somewhat more female and less employed. Our sample closely resembles the 2000 Census statistics for the Atlanta Metropolitan Statistical Area in terms of household size, income, housing tenure, and commute times, although our sample is older and more educated than metro averages. The spatial distribution of all 946 respondents can be shown in Figure 2, and the descriptive statistics of key variables are summarized in Table 1.

**[Insert Figure 2 here]**

**[Insert Table1 here]**

The *Support for BeltLine* variable captures respondents' responses to the question "Do you think that the BeltLine project is a good or a bad idea?" The survey presented five response options: "It is definitely a good idea," "It is more good than bad," "It is more bad than good," "It is definitely a bad idea," and "I need more information to decide." Table 1 reports statistics for *Support for BeltLine* after coding along a -2 to 2 scale (i.e., -2 represents "definitely a bad idea", 2 represents "definitely a good idea"). 18.7% of respondents selected "need more information," and their *Support for BeltLine* is coded as missing. Respondents are generally supportive for the BeltLine. Only 10% of the sample indicate the project was a bad idea (i.e., *Support for BeltLine* < 0). Respondents also tend to have relatively strong beliefs that the BeltLine will transform Atlanta. This is consistent with proponents' arguments that the BeltLine will transform the whole city. When asked to assume that the BeltLine is completed as planned, respondents show a variety of expectations about the frequency of their future use of BeltLine greenspace and transit. They are also, on average, pessimistic about Atlanta transit and quality of life generally. On average, respondents are 49 years old and have some college education, a household of 2.6 people, and an annual household income of $68,000.

Since this study focuses on the relationship between support of and the distance to the BeltLine, measuring the location of respondents is critical. A final question in the survey asks respondents if they want to receive a report when the survey is done. Half of them provided their specific mailing addresses to receive the report. For the other half that declined, their locations are only known at the zip code level. One simple solution to getting accurate locations is to drop all records lacking precise addresses. But dropping these records will possibly cause two problems. First, dropping half of the records with accurate information because of missing values for a single variable discards a lot of otherwise good information. This is a waste of data from an efficiency perspective. Secondly, and even more importantly, dropping records without precise addresses raises the concern of selection bias. People willing to receive reports may care more about greenspace and transportation and thus are more likely to support projects like the BeltLine. In this sample, those providing street addresses expressed more optimism about the BeltLine as reflected in a greater mean *BeltLine will transform ATL* value (0.95) per a t-test (t=3.0).[1] To keep discarding information and to avoid selection bias, this study

[1] While mean *Support for BeltLine* is not significantly different between the sample providing addresses and sample not providing addresses here, other variables do differ between samples. Those reporting addresses tended to be in the City of Atlanta (though not necessarily in the TAD), to be more optimistic about the BeltLine, and to expect to use the BeltLine greenbelt and transit more than other respondents. The means of the other variables in Table 1 are not significantly different between samples.

introduces four approaches to impute missing locations as described in detail in the Methodology section.

Another critical issue regarding distance is whether the respondent is inside the ring or "donut" of the BeltLine. The role of distance inside the donut is mixed, because moving away from one side of the BeltLine means moving closer to the other side. Thus, the influence of distance for this group of respondents is expected to be smaller than for those outside the ring. The sample size of this group, however, might be too small to affect the overall result. Only seven (out of 459) respondents with actual addresses reside within the donut. After including all missing-address respondents that are in zip codes adjacent to BeltLine TAD, the total possible "donut hole" respondents are only 20 (out of 854). For the simplicity of interpretation, the distance to the BeltLine TAD is logged.

The maps of jurisdictions (including the zip code maps, the boundary of the BeltLine TAD and the city of Atlanta) are obtained from the City of Atlanta Department of Planning GIS. The block group-level census data are publicly available from the United States Census Bureau.

## Methodology

This study explores the factors related to public support for the BeltLine, especially the distance to the BeltLine TAD. To identify how distance and having kids relate to opinions about the BeltLine, an ordered logistic regression model is estimated:

$$
\begin{aligned}
Support = \alpha &+ (distance)\beta_1 + (jurisdiction)\beta_2 + (kids)\beta_3 + (jurisdiction \times kids)\beta_4 \\
&+ (renter)\beta_5 + (renter \times distance)\beta_6 + X\gamma + u
\end{aligned}
$$

Where $\beta$ and $\gamma$ are vectors of coefficients, *X* is a vector of other explanatory variables (e.g., household income, age, education, tenure) and *u* is the error term. The *kids* variable represents the number of kids in the household, which is generated from the survey question about household size. For a household with three or more members, *kids* is defined as the household size minus two. For a household size of two or less, kids is defined as zero. As mentioned previously, since lowering future school quality could affect APS-wide property values, the *jurisdiction* dummy is defined as being in City of Atlanta. The interaction term between *jurisdiction* and *kids* is introduced to capture the additional concern of school quality for parents in Atlanta. The dummy and interaction variables for *renter* are used to identify the possibly different distance relationships for homeowners and for renters. If the homevoter hypothesis holds, the *distance* coefficient should differ between homeowners and renters (i.e., $\beta_6$>0), because property value changes have different meanings for these two groups.

In order to further explore the sources behind the BeltLine's public support, the expected usage of BeltLine amenities are added into the model:

$$Support = \alpha + (distance)\beta_1' + (demand)\beta_7{}' + (jurisdiction)\beta_2{}' + (kids)\beta_3{}' + (jurisdiction \times kids)\beta_4{}' + X\gamma' + u'$$

If the expected *demand* absorbs most of the significance of distance's role, the household’s intent to use rather than the property’s accessibility is revealed to be the main mechanism behind the distance coefficient. In that case, mechanisms related to the value attached to the property are less important for residents’ support. Two variables, the expected frequencies of using BeltLine parks and of using BeltLine transit *once the BeltLine is completed as planned*, are used here to represent the individual demand for key BeltLine amenities.

These models identify the factors that help explain BeltLine support or the degree to which the respondent thinks the major urban redevelopment project is a good idea. These factors include various respondent characteristics like income, education, and age, as well as property-related measures that influence support per the homevoter hypothesis. Under that hypothesis, and assuming the BeltLine raises home prices more for nearby homes, the distance coefficient should be negative. Further, that should be true in a model conditional on other respondent characteristics, because those are not capitalized into property values whereas location is. If renters do not benefit from rising housing prices (e.g., Noonan, 2012), the homevoter hypothesis predicts less support from renters (i.e., $\beta_6>0$).

The negative correlation between *Support* and *Distance* (Spearman rank-order $\rho$=-0.16) still leaves much variation in public support to be explained. The models allow for other factors, beyond property value impacts, to also explain variation in support. In addition to common socio-economic factors like income and education, length of time in residence is included in the first set of models. Newcomers' support might differ, for instance, if they prefer their neighborhoods to remain as they recently selected into or if they moved in anticipation of the BeltLine's transformation. The second set of models explicitly control for individuals' expected use of the future BeltLine, once completed as planned. While this expected use negatively correlates with distance, whether it is location, tastes, or both that explain variation in support remains an empirical question. Because support and expected future use are simultaneously determined by respondents in the survey, causal interpretations are not warranted.

As mentioned previously, only half of the respondents provided their addresses. To expand the sample size and to avoid selection bias, this study introduces four approaches to impute missing locations. First, zip code centroids are used to represent the locations of these no-address respondents. This approach has two significant shortcomings. To start, assigning missing-address respondents to zip code centroids brings in measurement error. For zip codes containing large non-residential areas, such as a large park or public facilities, using centroids may be misleading even on average. Moreover, assigning all missing-address respondents to zip code centroids eliminates the potential power of within-zip-code distances to explain different support levels. Introduce this measurement error likely attenuates the distance coefficients toward zero.

Second, instead of using simple geographic centroids of zip codes, population-weighted centroids can be generated by overlapping the census block (i.e., smaller than block groups) population map and zip code map.[2] This captures the population distribution at the block level within each zip code area. This approach should be more accurate than geographic centroids by taking the within-zip-code population distribution into consideration. Population-weighted centroids can help avoid the first shortcoming mentioned in the previous paragraph. This approach, however, does not help mitigate the problem of eliminating the within-zip-code explanatory power of distance, since all missing-address respondents in a given zip code are still assigned to the same location.

The third approach imputes missing distances with all the available variables in the dataset. In practice, the imputation approach first regresses valid distances on all of the other variables (excluding *Support for BeltLine* in this case), and utilizes the

[2] For a census block overlapping multiple zip codes, the census block is divided into pieces by zip code boundaries. The population of the census block is then distributed by the area of each piece. The population-weighted centroid can thus be generated using the software ArcGIS.

regression results to impute missing distances (Little, 1992). This approach generates a specific distance for each missing-address respondents, and thus eliminates the problem of assigning many missing values to the same location. As a result, the distance coefficient with this approach is expected to fit more precisely in the main regression model than those with centroid-based approaches.

One concern about the imputation method is that the auxiliary regression coefficients are directly applied to the imputation of missing distances, neglecting the fact that regression estimates (i.e., imputed values) are distributions, not precisely measured values. To fix this problem, this study introduces a multiple imputation approach as the third approach to generating missing distances. The concept of multiple imputation is similar to simple imputation except that it explicitly accounts for the noise in the imputed values. Instead of using fitted values from the auxiliary regression as if they were the measured value, multiple imputation takes a random sample of imputed values based on the estimated coefficient distributions in the imputation regression (Rubin, 1987). Each estimated distance is then used in the main regression. After repeating this imputation-regression process multiple times, a series of regression results is combined into a single set of results. In this study, the imputation-regression process is repeated 100 times.

Finally, the fourth approach of filling missing distances applies a truncated regression method to the multiple imputation process. One concern of the imputation process is that the imputed distance might fall outside of the possible range, given the restriction of zip code boundary. For each missing-address respondent, the possible distance to the BeltLine TAD is bound by the shortest and longest distance from the zip code to the BeltLine TAD. To add this restriction to the multiple imputation process, this study introduces the truncated regression method. By providing the lower and upper bounds for each missing distance, truncated regression allows the multiple imputation process to generate imputed distances that are within zip code boundaries.[3] Again, the imputation process is repeated 100 times.

These four methods for generating missing distances allow the main regression model to be estimated. The estimated coefficients of distance are then compared with each other and with the estimator generated by including observations with actual addresses only (i.e., listwise deletion).

The generation of jurisdiction variables is straightforward for respondents with actual locations. Dummy variables are generated with GIS tools, based on whether they are in the jurisdiction or not. It is a more complicated task for missing-address respondents, since their actual locations are not known. In this study, the proportion of zip code area within certain jurisdiction district is used to generate the value when missing. For example, for missing-address respondents in a zip code that does not intersect the BeltLine TAD, their *In TAD* jurisdiction variable is coded as zero. For a zip code that is only partly inside the BeltLine TAD, the *In TAD* jurisdiction variable is coded as the proportion of area overlapping the BeltLine TAD. This same approach to jurisdictional variables is followed regardless of which distance imputation method is used.

## Results

Table 2 displays the regression results. The dependent variable measures the individual support for BeltLine on an ordinal scale. The independent variables include: logged distance; jurisdiction dummies (located in BeltLine TAD, City of

[3] Due to computation limitations, the upper bound of missing distance is generated by doubling the distance between lower bound and geographic centroid of the zip code:
(Upper bound distance)=(lower bound distance)+2×(Distance between lower bound and the centroid)

Atlanta); number of kids; interaction terms between *Kids* and jurisdiction dummies; and demographic characteristics of respondents, such as logged household income, years living in current residence, age, and years of education. Each column represents a specific approach to imputing missing distances. Column 0 lists results for actual-address respondents only. For comparison, column 0' locates all respondents to the corresponding zip code centroids, even if precise addresses are known. Column 1 locates missing addresses at their zip code geographical centroids. The comparison between column 0' and column 1 immediately shows the importance knowing at least some precise addresses for estimating distance coefficients. Column 2 uses population-weighted zip code centroids. Column 3 utilizes multiple imputations. Column 4 applies multiple imputations via truncated regressions.

**[Insert Table 2 here]**

The low p-values shown in the model diagnostics of Table 2 indicate that all the models listed are statistically significant, as compared to the null models with no predictors. The reported pseudo R-squared values are relatively low. However, it is generally perceived that goodness of fit is not as important as statistical significance of explanatory variables (Estrella, 1998; Wooldridge, 2002).

The distance coefficient is negative and significant for all four imputation methods, as well as the model without any imputation (column 0). For other variables, imputation generally does not substantively affect the result, no matter which method of imputation method is selected. In other words, imputation enlarges the sample size without disturbing the result. The coefficients for the jurisdictional dummies (TAD, ATL) do change across imputation methods as expected, because different geographic information is used. These dummy variables prove insignificant in the model with the best imputed distance (column 5). Larger sample sizes with more information about distances should not yield similar results as reducing measurement error should lessen the attenuation of the *distance* coefficient toward zero. Comparing the results in column 0', where only zip code centroid distances are used (even if precise distances were known), to column 1 demonstrates this. The larger standard errors for the *Distance* coefficient in Column 0' shows that imputing missing values with limited information in the underlying spatial data can make it harder to detect underlying relationships. Obtaining precise location data for even just a subsample, as was done in this study, enables stronger results and more robust imputation methods.

The selection of imputation methods has an interesting effect on the result in terms of both magnitudes of coefficients and their significance. Generally, as more information and more robust imputation is performed, the estimated coefficient for distance grows (more negative) and it approaches the coefficient in column 0 with the smaller sample and no imputation. Imputing distance, however, does not alter its insignificant interaction terms (with *renter* and *newcomer*). The distance coefficients in all four imputation models range from -0.23 to -0.38. For truncated ordered logit model, holding all the other variables constant, increasing the logged distance to the BeltLine TAD by one unit will decrease the ordered log odds of having a higher level of support by 0.38. The jurisdictional variables show mixed results, generally negative for being in the TAD and positive for being in the city, though the estimates are noisy or have somewhat larger standard errors. Geographic location in terms of proximity to the BeltLine offers a stronger predictor of BeltLine support than the geographic jurisdiction indicators.

Generally, demographic variables and number of kids alone do not consistently explain different attitudes towards the BeltLine in any models. The variable *Kids* is not significant. In theory, the number of children can affect the attitudes toward the BeltLine in two ways. First, having more children could potentially create additional value from access to parks, trails, and even transit for parents of children who enjoy these amenities. This additional support from parents, however, does not appear in the results. Second, as mentioned previously, parents with kids may worry that the implementation of the BeltLine TIF might hurt the future quality of public schools, thus reducing their support of the project. This lack of support should be sensitive to jurisdictions. Only parents in school zones affected by the BeltLine TAD need to worry about this. Rather than include school catchment zones in the model, where boundaries vary by grade levels, jurisdiction (City of Atlanta) should proxy for school quality effects of the BeltLine as the fiscal impact of the BeltLine TIF will be eventually borne by all public schools in the city. The amenity demand may rise with more children regardless of the jurisdiction, but the concern over school quality impacts should be rising with more children only for those in the APS jurisdiction.

The interaction terms between jurisdictions and kids number generally support the argument in the previous paragraph. The interaction terms between *In Atlanta* and *Kids* show a strong and significant negative relationship to support. Holding all the other variables constant, having one additional kid decreases the ordered log odds of being in a higher level of support by 0.84 for respondents in City of Atlanta but not otherwise. Further, the joint significance test for the two *Kids*-related variables shows that they together are related to respondents' support of the BeltLine.

The two renter-related variables are not significant (individually or jointly) for all models. Renters' support for the BeltLine is not significantly different from that for homeowners. This result is unexpected in light of the homevoter hypothesis. The homevoter hypothesis holds that property value increases are the main mechanism behind the distance or proximity effect. In this case, renters would not be as supportive of the BeltLine as homeowners at the same close distance, because renters will suffer from the property value increase in terms of higher rents while gaining no benefits from speculating on the as-yet unbuilt project.

The fact that renters in the sample do not favor the BeltLine less than homeowners implicitly rejects the homevoter hypothesis. To further confirm this result, a Chow test is introduced. By interacting the variable *renter* with all the other explanatory variables in Table 2, the results for homeowners and renters are estimated separately. The joint F-test for all the renter-interacting variables fails to reject ($F = 0.50$) the hypothesis that renters support the BeltLine identically to homeowners. In other words, there is no evidence showing that renters favor the BeltLine differently than homeowners in the sample. Albeit indirectly, the homevoter hypothesis is not supported in this case.

To further identify the mechanism behind the role of distance, the second set of models that includes expected use variables are introduced in this study. The results are listed in Table 3. Both restricted models (without expected use) and unrestricted models are listed in Table 3, for comparison purposes. Because the results from different imputation methods are so similar to each other, the comparison in Table 3 focuses on specifications using only multiple imputation with truncated regressions.

**[Insert Table 3 here]**

The expected use variables are strongly significant in the unrestricted model. Also, the distance coefficient fades after including expected use. This result suggests that the main mechanism behind distance's role is the future accessibility to and expected use of BeltLine amenities. Homevoters should support a BeltLine that raises their property values, an effect related to property distance (see Immergluck, 2009), regardless of the tastes or expectations of the property's current resident. Yet Table 3 indicates that it is the current resident's expected use of the BeltLine that drives support, rather than the property's proximity to the BeltLine. There are several explanations for this surprising result. First, the logged distance to the BeltLine TAD might not be a good proxy to the price gradient caused by the project. Given that the BeltLine is a mixed project that includes green space, transit, and affordable housing, the price gradient might not be as straightforward as a function of distance. Noonan (2012) provides some empirical evidence that the price impacts of BeltLine (driven by speculation) are not consistently positive according to a variety of hedonic price models. Second, this study examines survey responses instead of actual votes. The online sample and potentially less deliberation in survey answers may, though not likely, bias the result. Finally, residents might just not be rational or deliberative enough to consider their support for the BeltLine outside of their direct use value. In this regard, the homevoter hypothesis finds little support in the case of the Atlanta BeltLine.

## Discussion and Conclusions

This study explores the relationship between distance and other factors in explaining support for the Atlanta BeltLine. Public support significantly declines as distance to the BeltLine increases. The inclusion of expected future use in the model, however, reveals that individual preferences and expected use drive this relationship rather than an independent role of proximity. Under the assumption that property value increases due to the BeltLine rise with proximity to it, these results provide little support to the homevoter hypothesis. The results point to the general public thinking of this major redevelopment project in terms of its costs and benefits to them rather than as a "homevoter" concerned merely about their property values. For example, the results show that parents in the City of Atlanta support the BeltLine less. This supports the conclusion that parents' concerns about TIF affecting future school quality for their kids (rather than for their property values) hampers the support for the project. Such a finding using 2009 survey data comports nicely with renewed legal challenges over financing out of school funds post-2009 and the recent and ongoing conflict over the BeltLine TAD's impact on APS financing.

Gentrification around the BeltLine raises interesting and important questions for our understanding of public support for projects like this. The BeltLine redevelopment areas may target neighborhoods populated by those more apt to support it, just as supporters may move nearby in anticipation. This spatial sorting around the project is both an essential aspect of the project's design and success and a source of concern for those seeking equitable redevelopment (Noonan, 2012). The unrepresentativeness of BeltLine neighbors and the prospects of more moving in raise important challenges for measuring the project's costs and benefits, and understanding where its incidence occurs. The neighbors' benefits and costs do not generalize to other populations. Turnover in neighbors, themselves a mix of owners and renters, complicate attempts to identify the project’s impacts. While this study examines a snapshot of support in the early stages of implementation, future work would do well to study the dynamics around the BeltLine and similar projects going forward. To date, the BeltLine reports nearly a half billion dollars in investment, seven miles of completed trails, 200 new acres of parks, and 15,400 new housing units (Atlanta BeltLine Inc., 2015). But concerns over progress, affordable housing, and transit (Blau, 2016; Mehrotra, 2014) grow even as the BeltLine grows. How public support shifts, and how the public itself shifts, over time present important aspects of these kinds of projects.

The results of different imputation methods shed a light on the technical problem of missing precise spatial location values. Generally, imputation enriches the sample size without altering the results when there are at least some precise location values available. The selection of imputation method does not seem to be a critical issue in this case, since the results remain consistent among methods.

The most important policy implication of this study follows from its disconnecting property value increases with public support for the BeltLine. In this case, residents support the Atlanta BeltLine because it provides *them* with local amenities, without separate considerations for this project's impacts on their housing prices. This is an important finding, especially for urban planners who seek for public support. Urban redevelopment projects worldwide usually emphasize on the economic regeneration (Couch & Dennemann, 2000), but local citizens also value facilitation of daily lives, such as public transit (Chan & Lee, 2008). APS parents and would-be users support the project differently even if its impacts capitalize into property values regardless of respondent attributes. This result provides guidance for the promotion of these kinds of urban redevelopment projects. The findings should be interpreted with caution, however, since the support and the usage expectation are decided simultaneously. For example, it is inappropriate to claim that enhancing residents’ expectations about their parks usage will stimulate their support for the program based on the result of this study. While both measures move together, the causal relationship remains unsettled in this case.

The results shed light on factors associated with supporting this major urban redevelopment project, but other influences remain undetected. Location clearly matters, but residential locations may be driven by BeltLine opinions rather than the other way around. More work is needed to identify other key drivers. Our models of public support show many commonly used measures (e.g., income, age, renter status) as insignificant. The TIF funding approach and the homevoter hypothesis provide some variables to explore, but alternative explanations exist. Factors like race and workplace location, unmeasured in this survey, may also matter. Even though our 2009 'snapshot' analysis of BeltLine attitudes can say little about gentrification, survey responses foreshadowed the renewed conflict over school funding (Blau, 2016) and the BeltLine's popularity today among trail users (Mehrotra, 2014). As other cities like New York and Seoul implement major, transformative projects, researchers would do well to learn from those cities’ experiences to better understand the nature and drivers of public support for the redevelopment.

There are several concerns and limitations to this study from the data analysis perspective. The first issue is the possible measurement error issue in the dependent variable: the support for the BeltLine. Respondents of the survey hail from all over the metro Atlanta area. It is arguable that some of them are too far away to credibly express support for the BeltLine— though the effective range of BeltLine is also arguable. One argument is that these distant responses are just random noise, which should not affect the estimates. Another argument is that these distant respondents only respond because they care about the BeltLine, even though they are not really affected or should otherwise be excluded from the study. In this case, the support from these distant observations in the sample are expected to be “too high” compared to the population. This self-selection problem would result in underestimating the distance effect, because the support in distant areas is not as low as it should be. In sum, the measurement error caused by including excessively distant respondents either does not affect the estimators or gives us lower-bound estimates, depending on how the measurement error is interpreted.

Another measurement error issue comes from missing addresses. Half of the respondents opted not to provide their addresses when asked if they want to receive the final report of the survey. This missing-address issue is not random, because respondents who decline to receive the report are likely to care less about the topic and be less supportive of the BeltLine. Therefore, dropping less-supportive observations may bias the estimated distance coefficient toward zero, since the effect is diluted. This bias is not evident in the results. The four approaches to impute these missing addresses are not perfect, but offer advantages in terms of avoiding bias while conservatively allowing for additional error in the imputation.

Measurement error in the *Kids* variable also needs mentioning. First, using a categorical family size question to infer the number of kids creates error. Again, this error in independent variable is expected to increase standard error and biases the estimator toward zero. Second, not having information on the age of the kids is another limitation of the study. For respondents with older kids, having kids should not affect the distance coefficient, since they care less about the potential influence of the BeltLine on school expenditures. This could attenuate the estimated *Kids* relationships, again providing a conservative estimate here. In addition, failing to account for childless households expecting to have kids in the near future might also weaken the *Kids* coefficients relative to the households without kids. Better measures for household composition in the original survey would have strengthened the results.

Generally, the possible sources of measurement errors are likely to either amplify the standard errors or perhaps even bias coefficients toward zero, making the estimators conservative in their approach. Understanding the possible error sources and the consequences helps us appreciate what the true values would likely be, even though the estimators are not perfectly accurate. These results indicate that the considerable public support for the BeltLine can be partly explained by individual respondents' intended future uses of the BeltLine amenity, more so than the distance of their home to the BeltLine. This is true for both owners and renters and regardless of how the imprecision in measuring distance is addressed. Further, support is lessened for households with many kids inside the BeltLine TIF zone's school district, consistent with concerns over future school funding. Altogether, these results show support stemming from respondents' particular circumstances and inclinations more than from the expected impact on their housing values as the homevoter hypothesis would hold.

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